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TECHNICAL MEMORANDUM

Date: February 7, 2018

To: Wenck

From: Luke Martinson, WEST, Inc.

Subject: Leavitt Reservoir Expansion Project – Non-wetland Woody Riparian Inventory

INTRODUCTION

The Wyoming Water Development Office is proposing to enlarge the existing Leavitt Reservoir near Shell, Wyoming through constructing a new dam (Figure 1). The new dam will be larger and located northwest of the existing dam. The existing dam will be demolished as part of the project. In addition to the new dam, other infrastructure (e.g., supply line and transport pipeline) that will support the enlargement have been proposed (Figures 2). WEST conducted biological surveys within the proposed disturbance area to inventory aquatic resources, map non-wetland woody riparian communities, and conduct species specific surveys for U.S. Fish and Wildlife Service (USFWS) listed species. This technical memorandum discusses the non-wetland woody riparian community survey and results within the proposed disturbance area.

Methods

WEST conducted a field survey to inventory non-wetland woody riparian communities within the proposed disturbance area on August 13-15, 2017 (Figure 1 and 2). The disturbance area included the proposed embankment, inundation area, borrow areas, diversion dam, supply line corridor, transfer line corridor and diversion, and roadway raise. A small section of disturbance area was added after the field effort, and therefore not surveyed (Figure 2). Non-wetland woody riparian communities included all shrub and forested areas located near aquatic resources not identified as wetlands (see WEST 2017). Wyoming big sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*), rubber rabbitbrush (*Ericameria nauseosa*), and other upland shrub communities not commonly associated with aquatic resources were not inventoried as part of this study.

Non-wetland woody riparian areas were surveyed during the aquatic resource inventory. All habitats within the disturbance areas were evaluated, except the non-surveyed area. The non-surveyed area was evaluated by a desktop assessment and the biologist's recollection of field conditions. For all other areas, the location, species, and other general habitat conditions were noted for each non-wetland woody community identified during the field survey. Non-wetland woody polygons were annotated on aerial imagery in the field. These annotated polygons were then digitized in ArcGIS after the field survey. Photographs were taken to document each non-wetland woody community.

Results

Eighteen polygons totaling 5.18 acres of non-wetland woody riparian communities were identified in the proposed disturbance area (Table 1 and Figure 3 and 4). Two main non-wetland woody categories were identified: 1) Reservoir fringe shrub communities dominated by sandbar willow (*Salix exigua*); and 2) Forested riparian communities along named waterways dominated by cottonwood (*Populus* spp.) trees. Other smaller mixed-shrub and Russian olive (*Elaeagnus angustifolia*) non-wetland woody riparian areas also occurred in the survey area. Each of the non-wetland woody riparian areas is discussed in detail below.

Reservoir Fringe

There were 1.37 acres of non-wetland woody riparian communities identified along the existing reservoir margins (Table 1; Photo 1 and 2; polygons 3-6). Sandbar willow was the dominant species, with smaller percentages of Russian olive and salt cedar (*Tamarix chinensis*). Both Russian olive and salt cedar are classified as noxious weeds in Wyoming. In many locations, these polygons abutted palustrine scrub-shrub wetlands. The fringe areas occur in the proposed and existing embankment and inundation areas.

Forested Riparian along Waterways

A total of 3.35 acres of non-wetland woody riparian communities were identified along named waterways (Table 1). The waterways included multiple locations along Beaver Creek, Shell Creek, and the existing dam outflow. A mature mixed-forest community was identified along Beaver Creek (supply line and diversion dam location; polygons 10, 11, and 12). Forested species identified included plains cottonwood (*Populus deltoides*), lanceleaf cottonwood (*Populus deltoids*), Rocky Mountain juniper (*Juniperus scopulorum*), and river birch (*Betula occidentalis*), with an understory of river birch, buffaloberry (*Shepherdia argentea*), and chokecherry (*Prunus virginiana*). Cottonwoods were the dominant species in the riparian area (Photo 3). A similar species composition was identified along the second Beaver Creek location (pipeline to Beaver Creek; polygons 13 and 14); however, fewer large cottonwoods were observed and Russian olive, salt cedar, and sandbar willow were present (Photo 4). The forested community along the back of the dam also had a similar species composition (Photo 5; polygon 7, 8 and 9). The Shell Creek non-wetland woody riparian community was dominated by

mature cottonwood trees, with a smaller percentage of Russian olive at the creek crossing location (Photo 6; polygons 16, 17, 18).

Other Non-wetland Woody Riparian Areas

Only 0.46 acres of other non-wetland woody riparian areas were identified. These included a mixed shrub community (sandbar willow and Russian olive; Photo 7; polygons 1 and 2) along the existing Leavitt supply ditch and scattered Russian olive trees at the transfer diversion dam along Beaver Creek (Photo 8; polygon 15).

One polygon in the disturbance area was not formally surveyed. Based on notes and photos collected during the field effort, cottonwood trees and scattered Russian olives occur in the non-surveyed sections (Photo 9). Most of the non-surveyed area is row crops.

Summary

A total of 5.29 acres of non-wetland woody riparian areas were identified in the disturbance area, including 1.61 acres of shrub fringe along the existing reservoir shoreline, 3.22 acres of riparian forested, and 0.46 acres of other non-wetland woody areas. Shrub fringe along the existing reservoir and mixed forest along waterways were the primary non-wetland woody riparian areas identified.

Table 1. Non-wetland woody riparian polygons identified in the disturbance area.

Polygon ID	Type	Acres	Location
1	Mixed shrub	0.43	Leavitt supply ditch
2	Mixed shrub	0.03	Leavitt supply ditch
3	Shrub	1.11	Reservoir fringe
4	Shrub	0.27	Reservoir fringe
5	Shrub	0.07	Reservoir fringe
6	Shrub	0.16	Reservoir fringe
7	Forested	0.07	Back of dam
8	Forested	0.09	Back of dam
9	Forested	0.19	Back of dam
10	Forested	0.19	Beaver Creek
11	Forested	0.11	Beaver Creek
12	Forested	0.83	Beaver Creek
13	Forested	0.16	Beaver Creek
14	Forested	0.04	Beaver Creek
15	Russian olive	<0.01	Beaver Creek
16	Forested	0.72	Shell Creek
17	Forested	0.37	Shell Creek
18	Forested	0.45	Shell Creek
Total		**5.29**	

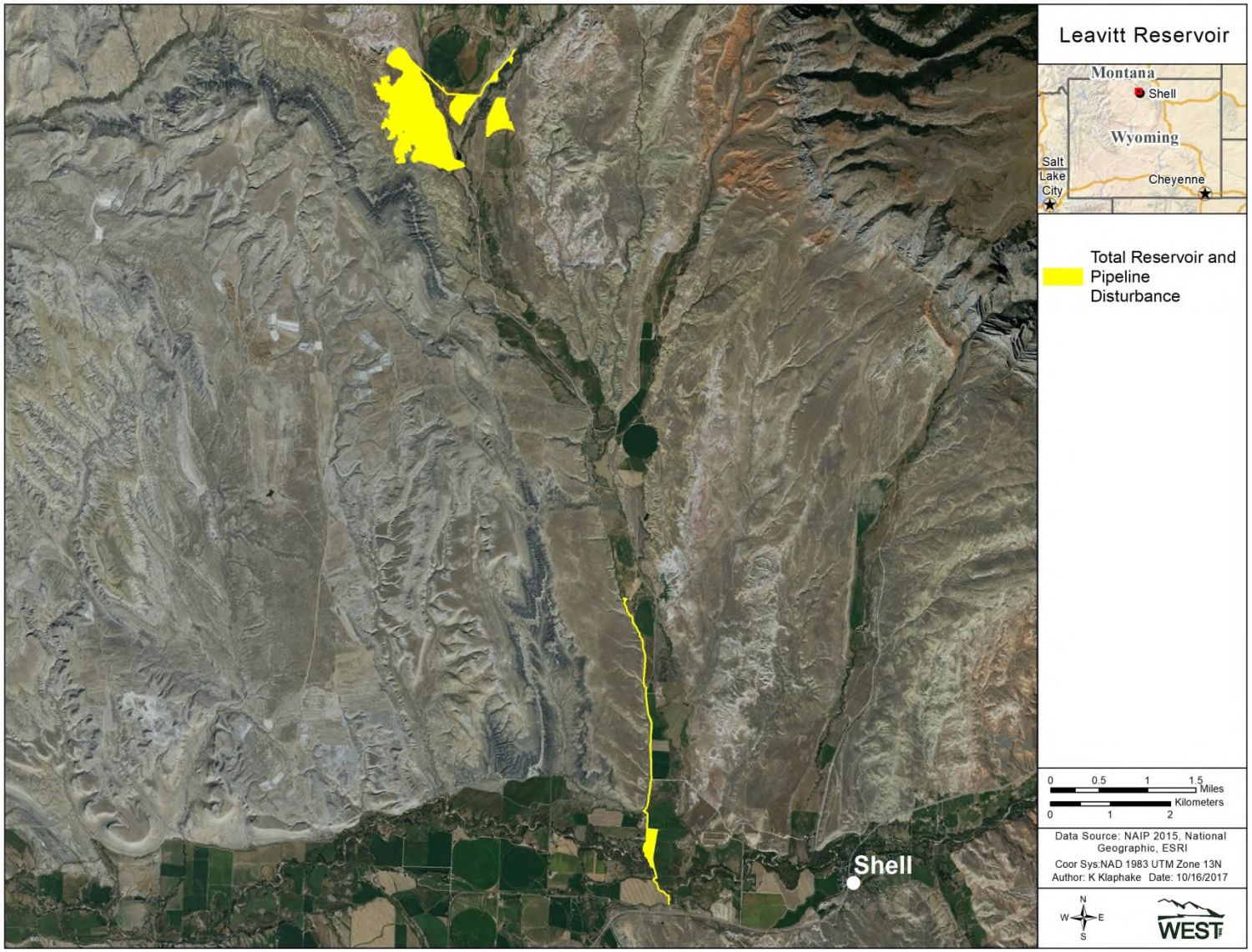

Figure 1. Leavitt Reservoir Expansion and Associated Infrastructure – Disturbance Area Overview.

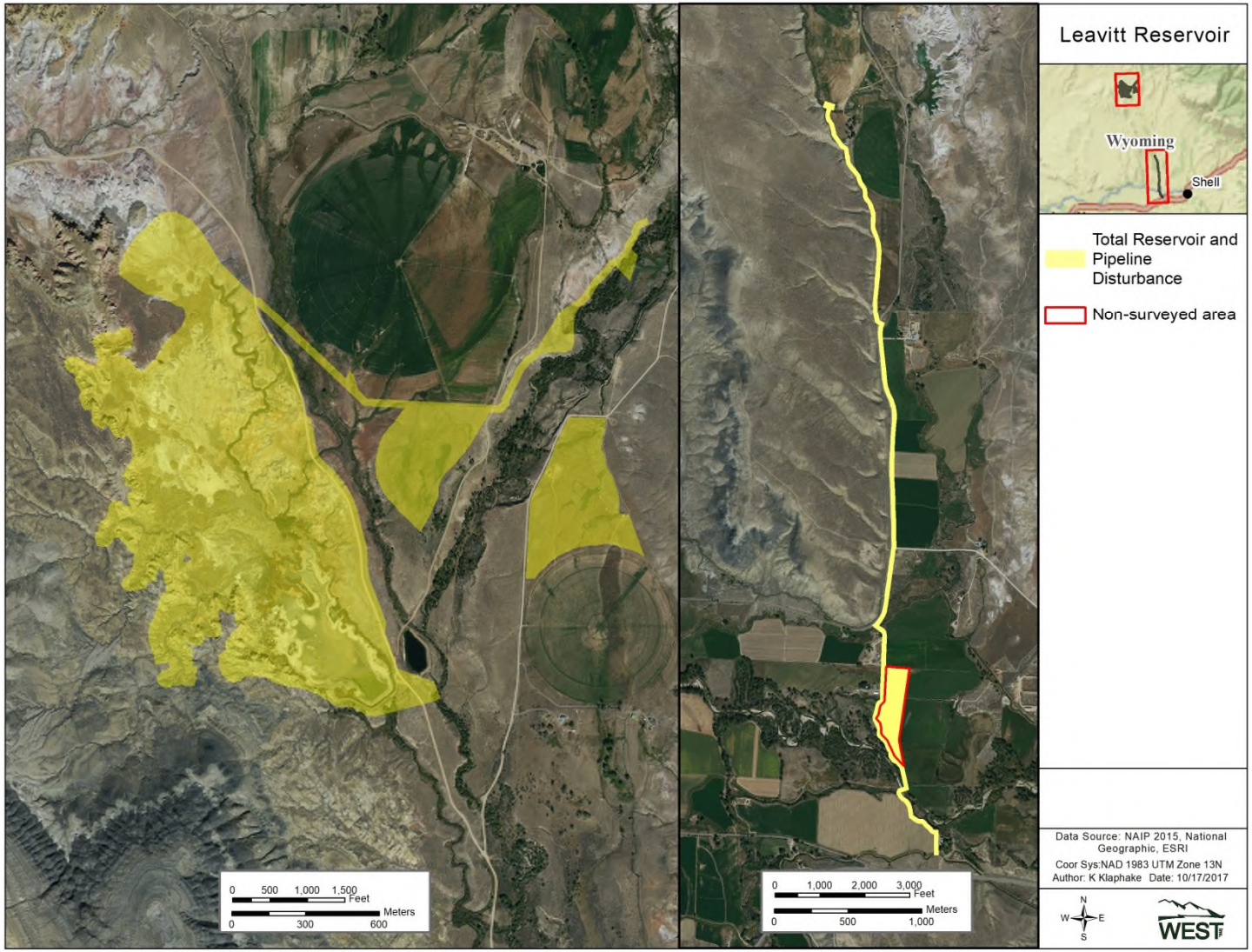

Figure 2. Leavitt Reservoir Expansion and Associated Infrastructure – Disturbance Area.

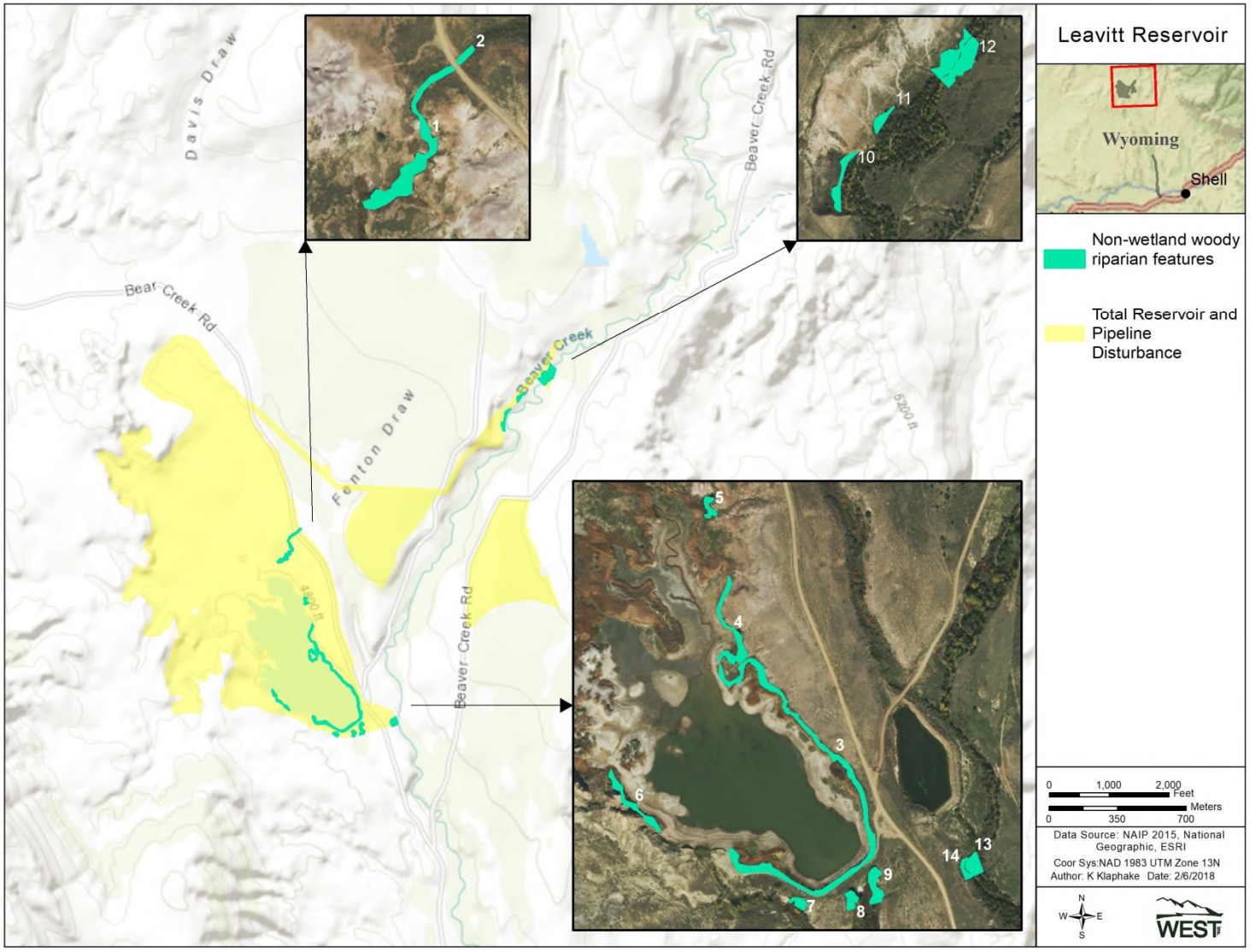

Figure 3. Leavitt Reservoir Expansion and Associated Infrastructure Non-wetland Woody Riparian Areas – North.

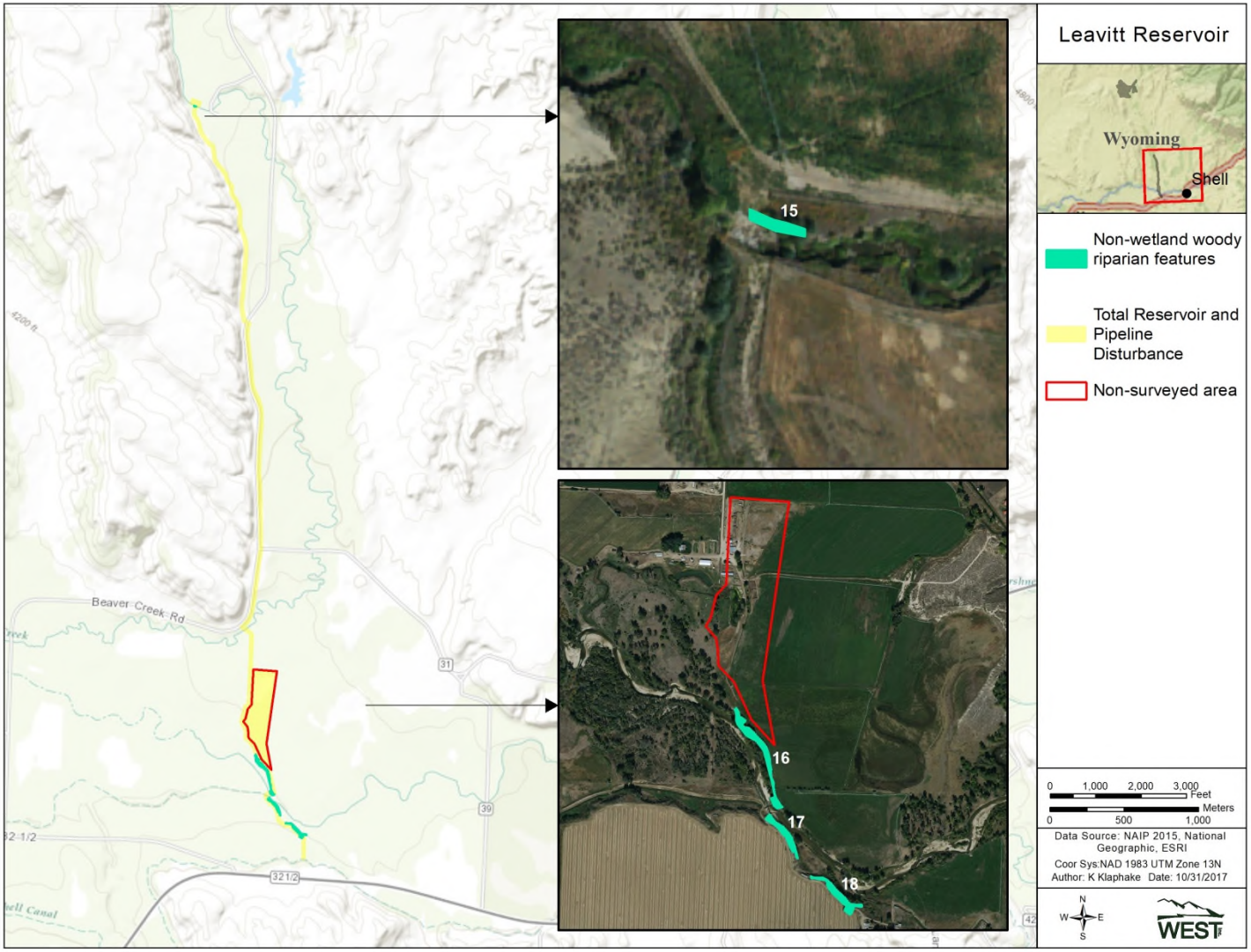

Figure 4. Leavitt Reservoir Expansion and Associated Infrastructure Non-wetland Woody Riparian Areas – South.

Photograph 1. Representative shrub-willow community along the reservoir fringe.

Photograph 2. Representative willow and scattered Russian olive community along the reservoir fringe.

Photograph 3. Representative mixed forest community along the supply line and diversion dam area along Beaver Creek.

Photograph 4. Representative mixed forest community in the pipeline corridor to Beaver Creek area.

Photograph 5. Representative mixed forest community on the back of the existing dam.

Photograph 6. Representative mixed forest community in the transfer line area (Shell Creek crossing location).

Photograph 7. Representative mixed shrub community along the existing Leavitt supply ditch.

Photograph 8. Representative Russian olive community in the transfer line diversion dam area.

Photograph 9. View east into the non-surveyed area; cottonwood trees in background were not surveyed during the formal field effort.